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UNEVEN WEAR OF PARTS REQUIRES EXCESSIVE REPAIR OF SOVIET AUTOMOBILES, TRUCKS

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Soviet automobiles and trucks are still not meeting requirements for uniform wearing quality of parts and units.

The ZIS-5 and the GAZ-AA automobiles are an example. The Ministry of Automobile Transport RSFSR has had to prescribe four major repairs on front axles and two engine overhauls between every rear-axle and transmission repair on these models.

The established period between repair of individual units is often upset by the operating conditions and uneven wearing quality of the parts and connections of the unit. Such connections and parts are the driving gear of the rear axle of a ZIS-5; the king pins, the Cardan shaft, and the piston rings of the GAZ-AA; and the second gear in the transmission of the M-1. In addition to the time involved in replacing the worn-out parts, there is usually time consumed in necessary stripping of the contiguous parts and connections. Thus, the uneven quality of parts leads to many automobile stoppages which increase the operating costs.

The parts and connections of the new GAZ-51 and ZIS-150 trucks are better, as far as uniform wearing quality is concerned, than those in the engines of the old models.

Manufacture of the GAZ-51 truck was started 2½ years before the ZIS-150, and certain preliminary data has already been assembled which shows a considerable increase in uniform wearing quality. At the same time certain weak points are noted. For example, our technical magazines have repeatedly discussed the uneven and decreased wearing quality of the connecting rod crank-shaft journals of the GAZ-51. There have been relatively frequent cases of spring and rotory-pin breakage, breakage of the flywheel gear rim, decreased wearing quality of the spring pins, king pins, the water-pump cylinder and other parts.

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There is also data dealing with the uneven wearing quality of new passenger automobile parts and connections, which have required frequent repairs. The list of such parts includes the rear-spring silent blocks and gear-shift parts of the Moskvich; the steering couplings, silent blocks of the front and rear suspension, the piston rigns, and the rear springs of a ZIS-110.

Since longevity and wearing quality are the most important requirements for the Soviet automobile, it is necessary to give special attention to cold starting of motors.

The present corrosion theory of cylinder wear, which has been established by more than 15 years of work by many experimenters, indicates that 60 - 70 percent of cylinder wear occurs when starting and warming up a cold motor.

The device for warming up the motor of the GAZ-51 automobile definitely represents a step forward, but as yet it is not sufficiently simple, quick, and convenient.

Simplicity, facility, and labor-consumption of repairs, are given too little consideration in the design of Soviet engines. The designs do not provide for accessibility and simplicity in dismantling and assembling, a minimum of assembly of dashboard and special equipment, simple removable parts in the wearing sections of the automobile, nor means for easy replacement of worn-out elements of expensive parts. The manufacture of automobile and truck parts must be put on a major industrial basis.

All these requirements received little consideration in earlier automobile manufacturing, and still are not considered sufficiently at present.

The usual method of automobile repair consists of replacing worn-out parts with new duplicate parts manufactured at the original automobile plant or in specialized plants. To date, however, an exception has been the major repair of cylinder blocks, which is very complicated and labor-consuming. The entire load of this repair is passed on to the garages and repair shops. The reboring of cylinders requires not only taking the motor from the chassis and completely dismantling it, but also the presence of special, expensive machines, and highly skilled personnel. Since such facilities are not always available in repair shops, the durability of a motor cylinder assembly which has undergone major repair is considerably less than that of a new motor. Moreover, the industry must manufacture an entire series of sizes of pistons and rings, and only highly skilled personnel can assort the series according to weight and sets.

The transition to dry, easily replacable sleeves, which can be produced at specialized plants as ready spare parts makes it possible to cast blocks from lower grade pig iron and sharply reduce scrap requirements in casting. Wieldy and simple sleeves can be easily and economically manufactured from high-quality, durable cast iron. The necessity for replacement sizes of pistons and rings is completely eliminated. All pistons and rings, like the sleeves, are produced in one specific size. The piston group and replacable sleeves can be changed without removing the motor from the chassis. It is necessary only to open the block head and remove the pan. In such a manner one of the most complicated, expensive, and labor-consuming repair operations becomes very simple.

In spite of all these advantages, dry, easily replacable sleeves have only been placed in the motor of the YaAZ-200 truck. It is absolutely necessary to put the sleeves in all Soviet automobiles.

From five to seven different types of lubricants are used in our automobiles. The number of lubrication points ranges from 30 to 60. The frequency of lubrication is from one day to 6 months (or a run of 15,000 kilometers). Lubrication of some points is inadequate and guards inadequately against wear.

The wearing of points of the chassis, which have specific pressures, (spring pins, pistons) shows that in certain motors pressure lubricants are not capable of withstanding the increasing loads.

More frequent lubrication, as is proposed in the instructions for the ZIS-150 automobile, is an inadequate solution. It results in considerable consumption of labor and resources, and sometimes does not even decrease wear, as in the case of the king pin of a GAS-AA.

The instructions for a ZIS-150 specify lubrication of 25 points of the chassis (king pins, spring pins, cylinders, and brake rods) with pressure lubricant every day, whereas the corresponding points on a GAZ-51 are lubricated approximately every 10 days (or 1,000 kilometers). Estimating that 15 minutes is consumed in lubrication of the 25 points and that there are 500,000 ZIS-150's in the country, we find that there would be a labor-consumption of 52 man-hours per day. The cost of effecting this one operation would be approximately 100 million rubles a year.

For decreased labor-consumption of the operations and increased wearing quality of the automobiles, our system of lubrication must be constructively changed and mechanized.

A radical solution to this problem is a central system of lubrication using light-weight oils. Such a system not only sharply reduces labor-consumption and facilitates servicing, but also reduces wear on parts because light oil withstands much greater specific pressure and has better flow to lubrication points than do pressure lubricants.

Gaskets, which are necessary in central lubricating for prevention of outflow, also serve as dust catchers. This also decreases wear on connections and units.

It is possible to prevent oil from freezing in the lines at low temperatures by using oil having the proper body and solidification point. Lubricating oil No 10 freezes at 50 degrees, lubricating oil No 4 at 30 degrees, and AU spindle oil at 45 degrees.

The introduction of a system of central lubrication for our automobiles is an urgent matter.

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